

WHAT IS CLAIMED IS:

1. A method of operating in a network in which a plurality stations communicate over a shared medium, comprising

using a carrier sense multiple access (CSMA) service for ordinary communication between the plurality of stations;

having a first station that desires to establish a first session of regularly repeated contention-free transmission intervals broadcast information descriptive of the first session to the other stations, wherein the first station can be any of the plurality of stations; and

having other stations that receive the broadcast from the first station defer from transmitting during the contention-free intervals of the first session.

2. The method of claim 1 further comprising distributing control over initiation and makeup of transmissions within the contention free intervals to a plurality of stations so that any of the plurality of stations can independently initiate a transmission within the contention free interval.

3. The method of claim 2 further comprising distributing control over the maintenance and termination of transmissions within the contention free interval to the plurality of stations so that any of the plurality of stations can independently terminate a transmission within the contention free interval.

4. The method of claim 3 wherein the plurality of stations act as peers with respect to one another in initiating, maintaining, and terminating transmissions within the contention free interval.

5. A method of operating in a network in which a plurality of stations communicate over a shared medium, comprising

providing regularly repeated contention free intervals;

providing CSMA communication during times outside the contention free intervals;

and

distributing control over the initiation and makeup of the contention free intervals to a plurality of stations so that any of the plurality of stations can independently initiate a transmission within the contention free interval.

5 6. The method of claim 5 further comprising distributing control over the maintenance and termination of transmissions within the contention free interval to the plurality of stations so that any of the plurality of stations can independently terminate a transmission within the contention free interval.

10 7. The method of claim 6 wherein the plurality of stations act as peers with respect to one another in initiating, maintaining, and terminating transmissions within the contention free interval.

15 8. The method of claim 1 or 5 wherein the regularly repeated contention free interval is approximately periodic.

20 9. The method of claim 1 or 5 wherein the contention free interval supports a plurality of transmissions, each using a different time segment within the contention free interval, so that a plurality of data streams can be transmitted using the contention free interval, with each data stream generally assigned to one of the different time segments.

10. The method of claim 9 wherein any of the plurality of stations is capable of independently inserting a further transmission into the contention free interval.

25 11. The method of claim 9 wherein at least one data stream is assigned to a plurality of different time segments spaced apart within the same contention free interval, thereby reducing latency for the at least one data stream.

30 12. The method of claim 11 wherein there are two different time segments from the same contention free interval assigned to the same data stream, with one time segment at or

near the start of the interval, and the other time segment at or near the midpoint of the interval.

13. The method of claim 10 wherein each of the plurality of stations keeps track of the number of transmissions being supported by the contention free interval and the amount of time used by each of the transmissions, so that the station can make a determination whether the contention free interval has sufficient remaining capacity to support a further transmission by the station.

14. The method of claim 9 wherein each of the stations sending a transmission during the contention free interval begins transmitting in response to recognizing that the transmission immediately prior to it has concluded.

15. The method of claim 14 wherein a transmission that is concluding includes a hand-off indication near the end of its transmission, and the transmission that follows is initiated based on receipt of the hand-off indication and the identity of the transmission that is concluding.

16. The method of claim 9 wherein each station independently keeps track of the usage of the contention free interval to determine whether there is sufficient time available in the interval to support a further transmission that the station has been asked to initiate.

17. The method of claim 9 wherein information characterizing each of the plurality of transmissions is conveyed to substantially all of the plurality of stations.

18. The method of claim 17 wherein the information characterizing a transmission includes information characterizing the temporal location of the transmission within the contention free interval.

19. The method of claim 16 wherein the information characterizing a particular transmission is conveyed to other stations not only by the station making the particular

transmission but by other stations that receive the information and retransmit it to other stations, thereby increasing the likelihood that the information will be conveyed to all stations.

5 20. The method of claim 9 wherein transmissions of different priority classes can share the contention free interval, and access to the contention free interval is given to a transmission of a higher priority class if insufficient time is available within the interval to support all transmissions seeking to use the interval.

10 21. The method of claim 20 wherein a transmission can be terminated if transmissions of higher priority consume enough of the contention free interval that insufficient time remains for continuing the transmission.

15 22. The method of claim 21 wherein the transmissions terminated are terminated following a last-in, first-out protocol.

23. The method of claim 21 wherein a limit is set on the fraction of time within the contention free interval that may be used by transmissions of a particular priority class.

20 24. The method of claim 23 wherein different fractions of the contention free interval are assigned to different priority classes, so that some priority classes are allocated more of the contention free interval than other priority classes.

25 25. The method of claim 20 wherein the sequence of transmissions within the contention free interval is ordered by priority class, with transmissions of higher priority classes occurring earlier than transmissions of lower priority classes.

30 26. The method of claim 20 wherein the sequence of transmissions within the contention free interval is ordered by sequence in which transmission was initiated, with earlier initiated transmissions occurring earlier than later initiated transmissions.

27. The method of claim 9 wherein short time intervals are provided between successive transmissions within the contention free interval, so that a station desiring to initiate a new transmission may begin the transmission during the short time interval, and other stations will learn that the new transmission has been inserted at that location in the contention free interval.

28. The method of claim 25 wherein a short time interval is provided following the last transmission of each priority class, so that a station desiring to initiate a new transmission with a particular priority class may begin the transmission during the short time interval following the last transmission of that priority class.

29. The method of claim 25 wherein a station desiring to initiate a transmission of a particular priority class will generally initiate the transmission between the last transmission of the same or higher priority class and the start of the first transmission of a lower priority class, thereby maintaining a priority order to the sequence of transmissions within the contention free interval.

30. The method of claim 29 wherein a short time interval is provided following the last transmission of each priority class, and the transmission of the particular priority class is initiated during the short time interval between the last transmission of the same or higher priority class and the start of the first transmission of a lower priority class..

31. The method of claim 1 or 5 wherein each of the stations independently follows a set of admission rules common to the plurality of stations.

32. The method of claim 9 wherein each transmission is assigned a unique identifier, and the identifier is conveyed to the other stations along with information characterizing the transmission.

33. The method of claim 9 wherein the length of the contention free interval varies with demand for contention free transmissions.

34. The method of claim 1 wherein in addition to the other stations that defer from transmitting during the contention-free intervals there are a plurality of legacy stations that lack the capability to defer.

5 35. The method of claim 16 wherein stations rely on observation of the network to independently keep track of the usage of the contention free interval to determine whether there is sufficient time available in the interval to support a further transmission that the station has been asked to initiate.

10 36. The method of claim 22 wherein the transmissions terminated are terminated following a last-in, first-out protocol within the same priority class.

 37. The method of claim 1 or 5 wherein the shared medium is an alternating current (AC) power line.

15 38. The method of claim 37 wherein the contention free intervals are approximately synchronized to the power cycle.

 39. The method of claim 37 wherein the contention free interval supports a plurality
20 of transmissions, each using a different time segment within the contention free interval, so that a plurality of data streams can be transmitted using the contention free interval, with each data stream generally assigned to one of the different time segments, and wherein the contention free interval duration is chosen so that at least some of the transmissions occupy a different portion of the power cycle during successive contention free intervals

25 40. The method of claim 38 wherein the contention free interval supports a plurality of transmissions, each using a different time segment within the contention free interval, so that a plurality of data streams can be transmitted using the contention free interval, with each data stream generally assigned to one of the different time segments, and wherein the
30 contention free interval duration is chosen so that at least some of the transmissions occupy a different portion of the power cycle on a repeating basis.

41. The method of claim 37 wherein the contention free interval supports a plurality of transmissions, each using a different time segment within the contention free interval, so that a plurality of data streams can be transmitted using the contention free interval, with
 5 each data stream generally assigned to one of the different time segments, and wherein the contention free interval duration is chosen so that the transmissions are intentionally not synchronized to the line cycle so that each transmission generally occupies a different portion of the power line cycle during successive contention free intervals.

10 42. The method of claim 1 wherein the information descriptive of the first session comprises the duration of the contention-free intervals.

43. The method of claim 1 wherein the information descriptive of the first session comprises a period of the contention-free intervals.

15 44. The method of claim 1 wherein the information descriptive of the first session comprises the time at which the first session will begin.

45. The method of claim 1 wherein the information descriptive of the first session
 20 comprises the address or addresses of the station or stations that are the intended receivers of the data to be transmitted during the first session.

46. The method of claim 1 wherein the information descriptive of the first session comprises the address of the station that is establishing the first session.

25 47. The method of claim 1 wherein a second station desires to establish a second session of regularly-repeated contention-free transmission intervals, wherein the second station can be any of the plurality of stations, and wherein the method further comprises:

30 having the second station determine the timing of the second session taking into account the information descriptive of the first session;

having the second station broadcast information descriptive of the second session to the other stations; and

having the other stations that receive the broadcast from the second station defer from transmitting during the contention-free intervals of the first and the second sessions.

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48. The method of claim 1 wherein the method further comprises having the first station transmit maintenance information during the first session.

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49. The method in claim 48 wherein the maintenance information descriptive of the first session includes a revised duration for the contention-free intervals.

50. The method in claim 48 wherein the maintenance information descriptive of the first session includes the time at which the subsequent contention-free interval starts.

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51. The method of claim 1 wherein the method further comprises having the first station transmit termination information during the first session, the termination information including the time at which the first session will end.

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52. The method of claims 1, 48, or 49 wherein at least a portion of the information descriptive of the first session is transmitted in one or more header fields of packets broadcast over the network.

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53. The method of claims 1, 48, or 49 wherein at least a portion of the information descriptive of the first session is transmitted in the packet body of packets broadcast over the network.

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54. The method of claims 1, 48, or 49 wherein at least a portion of the information descriptive of the first session is fixed ahead of time and is not included in the information descriptive of the first session.

55. The method of claims 1, 48, or 49 wherein the information descriptive of the first session is broadcast using the CSMA service.

5 56. The method of claims 1, 48, or 49 wherein the information descriptive of the first session is broadcast using the regularly-repeated contention-free session.

57. The method of claims 1, 48, or 49 wherein one or more stations other than the first station may propagate the session information generated by the first station.